

REMARKS

Claims 1-27 remain pending in the above-identified application and stand ready for further action on the merits.

No amendments to claims have been made in this response to the Office Action.

Accordingly, proper consideration of each of the pending claims (i.e., claims 1-27) is respectfully requested at present, as is entry of the present amendment.

Allowable Subject Matter

At page 2 of the Office Action, the Examiner indicates that claim claims 1-15, 19-21 and 24-26 are allowable.

The Examiner states in the Office Action states as follows:

The specification defines the term "moderately graded composition" between two adjacent layers means that there may be either a continuous or stepwise transition from the composition of one layer to the composition of the other layer. In the latter case, the term designates at least 5 steps, especially 10 to 50 steps of compositional transition from the substrate side to the surface side...

It is true that the instant specification describes at page 15, line 36 to page 16, line 5, as follows:

The term "moderately graded composition" between two adjacent layers means that there may be either a continuous or stepwise transition from the composition of one layer to the composition of the other layer. In the latter case, the interface may have at least 5 steps, especially 10 to 50 steps of compositional transition.

However, this description does not mean to narrow the scope of the claims, and especially, does not mean to limit "stepwise transition" to "at least 5 steps."

Claim Rejections under 35 USC § 102

At pages 3-5 of the outstanding Office Action, claims 16-18, 22, 23, and 27 have been rejected under 35 USC § 102(e) as being anticipated by Westerman US '696 (US 6,544,696) or Angelopoulos US '860 (US 6,682,860). Applicants respectfully traverse.

Reconsideration and withdraw of each of these rejections is respectfully requested based on the following considerations.

Legal Standard for Determining Anticipation

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001) "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claims 16-18 (Product Claims)

The Present Invention

As recited in claims (e.g., claim 16), the present invention directs to a phase shift mask blank of the present invention comprising:

a substrate which is transparent to exposure light; and
a phase shift film thereon,
said phase shift film having one side contacting the substrate and a surface side remote therefrom,
said phase shift film comprising a plurality of layers containing a metal and silicon in different compositional ratios which are stacked in such order that a layer having a higher etching rate is on the substrate side and a layer having a lower etching rate is on the surface side.

In short, a phase shift mask blank of the present invention has a substrate and a phase shift film thereon and the phase shift film has, for example, following features:

- (1) The phase shift film has one side contacting the substrate;
- (2) The phase shift film comprises a plurality of layers containing a metal and silicon in different compositional ratios;
- (3) The layer having a higher etching rate is on the substrate side; and
- (4) The layer having a lower etching rate is on the surface side.

Distinctions over Westerman US '696

For example, at claim 1 in column 8, Westerman US '696 merely discloses a phase shift mask, capable of shifting a phase of incident light and/or ultra violet radiation 180 degrees, comprising: a transparent substrate; a non-opaque etch stop layer disposed on said substrate, said etch stop layer selected from the group consisting of Cr-containing films; and a layer comprising a phase shifting material disposed on said etch stop layer.

However, Westerman US '696 fails to disclose or suggest the features of the present invention. For example, Westerman US '696 fails to disclose or suggest at least a feature of the present invention of "said phase shift film comprising a plurality of layers containing a metal and silicon in different compositional ratios which are stacked in such order that a layer having a higher etching rate is on the substrate side and a layer having a lower etching rate is on the surface side."

Further, Westerman US '696 teaches away from the present invention. In the Westerman US '696 reference, the etch stop layer is disposed on a substrate, and the phase shifting layer is simply disposed on the etch stop layer. In order to stop etching using such an etch stop layer, when the phase shifting layer has been etched, the etch stop layer must have a lower etching rate than the phase shifting layer. If the etch stop layer functions as a part of a phase shifter, etching features of the cited references are antithetical to the present invention. Thus, Westerman US '696 teaches away from the present invention.

Thus, the present invention (claim 16 and its dependent claims) is not anticipated by Westerman US '696.

Distinctions over Angelopoulos US '860

For example, at claim 1 in column 6, Angelopoulos US '860 merely discloses an attenuating phase shift mask blank for use in lithography comprising: a substrate comprising a quartz or fluorinated quartz material; an etch stop layer deposited on said substrate comprising a metal selected from groups II, IV, V, transition metals, lanthanides and actinides, said etch stop layer exhibiting improved etch selectivity; a phase shifting layer disposed on said etch stop layer; and said phase shift mask blank being capable of producing a photomask with substantially 180° phase shift and an optical transmission of at least 0.001% at a selected wavelength of <500 nm, wherein improved stability of said mask blank against irradiation of 157 nm photons is achieved.

However, Angelopoulos US '860 also fails to disclose or suggest the features of the present invention. For example, Angelopoulos US '860 also fails to disclose or suggest at least a feature of the present invention of “said phase shift film comprising a plurality of layers containing a metal and silicon in different compositional ratios which are stacked in such order that a layer having a higher etching rate is on the substrate side and a layer having a lower etching rate is on the surface side.”

Further, similar to Westerman US '696, in the Angelopoulos US '860 reference, the etch stop layer is disposed on a substrate, and the phase shifting layer is simply disposed on the etch stop layer. Thus, for the same reasons as explained above, Angelopoulos US '860 also teaches away from the present invention.

Thus, the present invention (claim 16 and its dependent claims 17-18) is not anticipated by Angelopoulos US '860.

Additional Consideration (Combination of the Cited References)

A *prima facie* case of obviousness is not established even if the cited references are combined since none of the cited references disclose or suggest the features of the present invention (e.g., "said phase shift film comprising a plurality of layers containing a metal and silicon in different compositional ratios which are stacked in such order that a layer having a higher etching rate is on the substrate side and a layer having a lower etching rate is on the surface side"), which is recited in claim 16. Further, as explained above, each of the cited references teaches away from the present invention. Likewise, it follows that a person having ordinary skill in the art would not be motivated by any of the teachings of the cited references to arrive at the present invention.

Accordingly, the present invention (independent claim 16 and dependent claims 17-18) is neither anticipated by nor obvious over the cited references.

Claims 22-23 and 27 (Process Claims)

Claims 22-23

In general, when product claims are found allowable, the process claims of making such products be found allowable as well under *In re Ochiai*. 37 U.S.P.Q.2d 1127 (Fed. Cir. 1995).

Claims 22-23 are directed to a method for manufacturing the phase shift mask blank of claim 16, respectively.

Since the phase shift mask blank of claim 16 is patentable, as explained above, claims 22-23 are also patentable.

Claim 27

Claim 27 is also directed to a method for manufacturing a phase shift mask. As recited in claims, claim 27 has the step of "forming a resist film pattern on the phase shift film of the phase shift mask blank of claim 16 by lithography." Since, as explained above, the phase shift mask blank of claim 16 is patentable, claim 27 is also patentable.

Accordingly, Applicants respectfully request the Examiner withdraw each of these rejections.

CONCLUSION

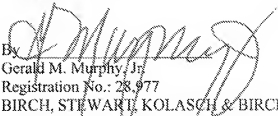
Based upon the amendments and remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance clearly indicating that each of the pending claims 1-27 are allowed under the provisions of Title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Gerald M. Murphy, Jr. (Reg. No. 28,977) at the telephone number below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

Dated: FEB 2 2007

Respectfully submitted,


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